

1 What is claimed is:

2 1. A visual image display, comprising:

3 a fiber-optic faceplate comprising:

4 an upper face;

5 a lower face; and

6 a multiplicity of straight optical fibers positioned between the upper face and the lower
7 face of the faceplate;

8 wherein longitudinal axes of the optical fibers are parallel to each other and substantially
9 perpendicular to the upper face and the lower face of the faceplate; and

10 wherein each of the fibers collects and projects through the faceplate a plurality of light
11 rays emitted by an ambient light source; and

12 a layer of suspended particle device (SPD) positioned underneath the lower face of the
13 faceplate, wherein the layer of SPD comprises:

14 particles suspended in droplets of a liquid light valve suspension, wherein the particles
15 are capable of absorbing or reflecting the plurality of light rays; and

16 a pair of electrodes positioned in contact with opposite surfaces of the layer of SPD,
17 wherein orientations of the particles depend on an application of an electric field to the
18 electrodes.

19 2. The visual image display of claim 1, further comprising a transparent conductive layer coated
20 underneath the lower face of the faceplate and on top of the layer of SPD.

21 3. The visual image display of claim 1, further comprising perimeter seals at both ends of the layer
22 of SPD.

23 4. The visual image display of claim 1, wherein the particles align in the direction of the electric
24 field when the electric field is applied, whereby the layer of the SPD becomes substantially transparent
25 to the plurality of light rays.

26 5. The visual image display of claim 1, wherein particles randomize when the electric field is
27 removed, whereby the layer of the SPD becomes substantially opaque.

28 6. The visual image display of claim 1, further comprising color filters positioned on a rear

1 substrate to produce a color display, wherein the rear substrate is positioned underneath the layer of
2 the SPD.

3 7. The visual image display of claim 1, wherein the fiber-optic faceplate is formed to a thickness
4 within the range of approximately 0.25 to 5.0 millimeters.

5 8. The visual image display of claim 1, wherein the layer of SPD comprises a layer of SPD fluid.

6 9. The visual image display of claim 1, wherein the layer of SPD comprises a layer of SPD film.

7 10. The visual image display of claim 9, further comprising a thin layer of index matching fluid
8 positioned on top of the layer of SPD film.

9 11. A visual image display, comprising:

10 a fiber-optical faceplate through which light can pass;

11 a layer of suspended particle device (SPD) positioned underneath the faceplate, wherein the
12 layer of SPD comprises:

13 particles suspended in droplets of a liquid light valve suspension, wherein the particles
14 are capable of absorbing or reflecting the plurality of light rays; and

15 a pair of electrodes positioned in contact with opposite surfaces of the layer of SPD;

16 wherein orientations of the particles depend on an application of an electric field to the
17 electrodes; and

18 a transparent conductive layer coated underneath the faceplate and on top of the layer of SPD.

19 12. The visual image display of claim 11, further comprising perimeter seals at both ends of the
20 layer of SPD.

21 13. The visual image display of claim 11, wherein the particles align in the direction of the electric
22 field when the electric field is applied, whereby the layer of the SPD becomes substantially transparent
23 to the plurality of light rays.

24 14. The visual image display of claim 11, wherein particles randomize when the electric field is
25 removed, whereby the layer of the SPD becomes substantially opaque.

26 15. The visual image display of claim 11, further comprising color filters positioned on a rear
27 substrate to produce a color display, wherein the rear substrate is positioned underneath the layer of
28 the SPD.

- 1 16. The visual image display of claim 11, wherein the layer of SPD comprises a layer of SPD fluid.
- 2 17. The visual image display of claim 11, wherein the layer of SPD comprises a layer of SPD film.
- 3 18. The visual image display of claim 17, further comprising a thin layer of index matching fluid
4 positioned on top of the layer of SPD film.
- 5 19. A visual image display, comprising:
6 a fiber-optic faceplate comprising:
7 an upper face;
8 a lower face; and
9 a multiplicity of straight optical fibers positioned between the upper face and the lower
10 face of the faceplate;
11 wherein longitudinal axes of the optical fibers are parallel to each other and substantially
12 perpendicular to the upper face and the lower face of the faceplate; and
13 wherein each of the fibers collects and projects through the faceplate a plurality of light
14 rays emitted by an ambient light source;
15 a layer of suspended particle device (SPD) positioned underneath the lower face of the
16 faceplate, wherein the layer of SPD comprises:
17 particles suspended in droplets of a liquid light valve suspension, wherein the particles
18 are capable of absorbing or reflecting the plurality of light rays;
19 perimeter seals at both end of the layer of SPD; and
20 a pair of electrodes in contact with opposite surfaces of the layer of SPD;
21 wherein orientations of the particles depend on an application of an electric field to the
22 electrodes; and
23 wherein the layer of the SPD becomes substantially transparent to the plurality of light
24 rays when the electric field is applied, and substantially opaque when the electric field is
25 removed; and
26 a transparent conductive layer coated underneath the lower face of the faceplate and on top
27 of the layer of SPD.
- 28 20. The visual image display of claim 19, further comprising color filters positioned on a rear

- 1 substrate to produce a color display, wherein the rear substrate is positioned underneath the layer of
- 2 the SPD.

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